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MONTANA'S ROCKY MOUNTAIN BIGHORN SHEEP

MONTANA DEPARTMENT OF FISH AND GAME

GAME MANAGEMENT DIVISION

HELENA, MONTANA

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OCTOBER, 1975

PREFACE

This publication is a summary of the status and management of bighorn sheep in Montana. Information was taken from previous surveys, investigations and studies - published and unpublished. The work of many department employees since 1941 was used as the basis for this report. The authors are cited in the list of references attached.

The report was prepared and edited by personnel of the Game Management Division. Regional Game Managers submitted draft reports for each region, which were incorporated into this report.

INTRODUCTION

The goal statement of the Montana Department of Fish and Game is:

> "To benefit the people of Montana and visitors with the optimum outdoor recreational opportunities; emphasizing the tangible and intangible values of wildlife and the natural and cultural resources of aesthetic, scenic, historic and archeological significance and; 1) consistent with the capabilities and requirements of the resource, 2) recognizing present and future human needs and desires, 3) insuring maintenance and enhancement of the quality of the environment."

An action program, funded under the Federal Aid in Fish and Wildlife Restoration Acts (16 U.S.C. 669-669i; 16 U.S.C. 777-777k) to assist in attaining this goal, is described under Federal Aid Project W-130-R as:

"The wild game animals, game birds and furbearers of Montana, constitute a most important natural resource belonging to the people of the State. There are many land uses which affect wildlife, as well as conflicting demands to develop the various resources. When resource management plans are made, it is imperative that the game and fur animal needs are also considered. Breeding stocks of wild game and fur can be produced and maintained on all suitable lands of the State with the proper management. Factual information is needed to maintain a program that will perpetuate the game resource and its habitat and provide a maximum amount of recreation and other benefits to the people of the State.

"Surveys and inventories will be conducted on a continuing basis of all game and furbearer populations, their habitat, and the utilization made of the game resource in all regional districts of the State. There will be surveys and inventories of (1) big game, and (2) game birds and furbearers. The data collected by these surveys and inventories will be analyzed and interpreted into game management recommendations and practices to make maximum recreational and beneficial use of the game and fur crops.

"I. Name of Study: Big Game Survey and Inventory

A. Objectives: To determine the distribution, characteristics, status, trends and production of big game populations in each management unit and regional district of the State.

To determine big game forage utilization, big game range, forage condition and trend in the above units. To determine the amount and characteristics of big game harvest. To obtain other information needed for big game management. To analyze and interpret these data and make management recommendations.

B. Justification: A continuing survey of big game, its habitat and harvest is needed to determine trend and status of this important resource. More people presently hunt big game in Montana than any other class of game. Big game also have a potential of damaging habitat when they are improperly managed.

Information from the survey and inventory will be analyzed and interpreted into management programs. Hunting season and other recommendations will be made through appropriate channels for all big game species..."

Both goal and program actively consider the needs of individual game species and intends for each species to be perpetuated.

An integral part of both goal and program, is sport hunting. For many wildlife species, sport hunting is allowed when it is not detrimental to that particular resource, and by the same token is not allowed when such hunting might be detrimental.

Sport hunting has been discussed by many people. Leopold (1937) defined game management as "...the art of making land produce sustained annual crops of wild game for recreational use." He repeatedly describes the relationships of sport hunting to and in game management. Dasmann (1964) stated, "A study of the annual cycle of the compensatory action of decimating factors has led to the conclusion that any relatively stable population

of game will produce each year a shootable surplus of young. This shootable surplus represents the excess of game above the carrying capacity of the environment. If this excess is not taken by hunters it will inevitably be lost sooner or later to decimating agents. If it is taken by hunting, the loss to other agents will be proportionately decreased. Attempts to stockpile this surplus to maintain an overabundance, have failed. If it is not harvested, it will die in any event. It therefore makes sense to use this surplus to supply the kind of recreation represented by sport hunting." Messelt (1971) presents a layman's view of the philosophy behind sport hunting in Montana when he stated, "It was to be after the development of agriculture and the numerous inventions that have made life easier and given man more freedom from the fear of hunger that we come to a period when sport hunting and fishing is to become the way of life to millions in America. So then we can now turn our attention from hunting because of the need for food to sport hunting and fishing for the combination of sport and the tang of wild meat, bringing with it the need of management and controls designed to protect certain species and provide for keeping our wildlife resources preserved for continuous enjoyment and use."

Burger (1973), Trippensee (1948), Allen (1962) and others adequately document that sport hunting is a legitimate and useful tool in the management of game animals.

The Montana Fish and Game Commission, through the Department of Fish and Game, has conducted a management program for Rocky Mountain bighorn sheep (Ovis canadensis) as well as other big game animals, which employs sport hunting as a management tool.

A brief history of Rocky Mountain bighorns (Ovis canadensis) in Montana has been presented in a department publication titled, "Game Management in Montana," edited by Mussehl and Howell (1971).

MONTANA HERDS

The 1941-42 Biennial Report of the Montana Fish and Game Commission shows location of sheep herds at that time. Fifteen locations are given, nine of which occur in the Madison-Gallatin-Absaroka area. The other six areas were Ural-Tweed, northeast of Libby; Marias-Glacier Park; Thompson Falls; the Sun River; Rock Creek, in Granite County, and the Tobacco Root Mountains. The map carried a notation that eleven head of sheep had been recently planted in the Gates of the Mountains area north of Helena. Including this introduction, there would be sixteen locations where sheep could be found.

In the 1971 publication, "Game Management in Montana," a map showing sheep locations indicate there were 25-30 areas where sheep could be found. Five of these were in the Madison-Gallatin-Absaroka area. The other areas were: Ural-Tweed, northeast of Libby; Kootenai Falls; Bull River-Cabinets (Berray Mountain) (results of a transplant); Marias-Glacier Park; Doris Mountain; Thompson Falls (originally native then transplanted in 1958); Wild Horse Island (result of a transplant); Bison Range (transplant); Sun River; Dearborn; Rock Creek, Granite County; West Fork of the Bitterroot; Sheep Creek (Cascade County - transplant) Gates of the Mountains; Bull Mountain (transplant); Tobacco Roots; Upper Belt Creek (transplant); sheep Creek (Meagher County - transplant); Judith River (transplant); Sixteen Mile (transplant); Two Calf Creek (transplant); Billy Creek (transplant); and Blue Mountains (transplant).

In addition to the sheep locations listed in "Game Management in Montana,"

transplants made since its publication are: East Fork of the Bitterroot; Little Rockies; Pryor Mountains; Highland Mountains; and Olson-Foster Creeks. (Table 1 - Figure 1)

Not all transplants were successful (Table 2). Some sheep herds previously considered as separate herds were found to be part of other herds. The location of sheep presently (1975) occurring in Montana by Department of Fish and Game Administrative Regions are:

Region One

Ural-Tweed	Native herd
Kootenai Falls	Transplant
Bull River-Cabinet Mountains	Transplant
Thompson River	Native and transplant
National Bison Range	Transplant
Wild Horse Island	Transplant
Doris-Teakettle Mountains	Transplant (unsuccessful)
Glacier Park (and adjacent)	Native

Region Two

Petty Creek	Transplant
Rock Creek	Native (transplant 1975)
West Fork of Bitterroot	Native
East Fork of Bitterroot	Transplant
Olson-Foster Creeks	Transplant

Region Three

Bull Mountains	Transplant (unsuccessful)
Highlands	Transplant
Tobacco Root Mountains	Native and transplant
Sixteen Mile	Transplant (unsuccessful)
Madison Range (Sheep Creek and Rock Creek)	Native
Upper Madison (Reynolds Pass)	Native
Watkins Creek	Native
Spanish Peaks	Native
Hyalite Peak	Native
Upper Tom Miner-Specimen	Native
Yellowstone-Mammoth-Boulder	Native

Table 1. Source, sex composition and release locations of mountain sheep transplants in Montana - 1942-1975.

Year	Trapsite	Male	Fem.	Unc.	No. Sheep Transplanted	Release Location and Number	
1942	Wagner Basin - Sun River	2	9		11	Gates Mtns., Lewis & Clark Co.	(1)
1943	Wagner Basin - Sun River	1	2		3	Gates Mtns., Lewis & Clark Co.	(1)
1944	Gallatin	1	-		1	Hannan Gulch, Lewis & Clark Co.	(*)
1944	Kootenai River	2	-		2	West Fork, Gallatin R., Gall.Co.	(*)
1947	Scattering Springs - Sun River	2	-		2	West Fork, Gallatin R., Gall. Co.	(*)
1947	" " " "	3	3		6	Wild Horse Island, Lake County	(2)
1947	Colorado (Tarryall Herd)	5	-	11	16	Billy Creek, Garfield County	(3)
1954	Scattering Springs - Sun River	3	3		6	16-Mile Canyon, Gallatin Co.	(4)
1954	Wild Horse Island	2	9		11	Kootenai River, Lincoln Co.	(5)
1955	Wild Horse Island	5	4		9	16-Mile Canyon, Gallatin Co.	(4)
1955	Wild Horse Island	4	4		8	Bull Mtns., Jefferson Co.	(6)
1955	Wild Horse Island	3			3	Kootenai River, Lincoln Co.	(*)
1955	Gibson Lake - Sun River	1	2		3	Bull Mtns., Jefferson Co.	(6)
1956	Gibson Lake - Sun River	5	8		13	Sheep Creek, Cascade Co.	(7)
1957	Gibson Lake - Sun River	1	6		7	Bull Mountains, Jefferson Co.	(6)
1957	Wild Horse Island	2	4		6	Bull Mountains, Jefferson Co.	(6)
1958	Wild Horse Island	4	1		5	Sheep Creek, Cascade Co.	(7)
1958	Wild Horse Island	4	3		7	Blue Hills, Custer Co.	(8)
1958	Gibson Lake - Sun River	-	5		5	Blue Hills, Custer Co.	(8)
1958	Gibson Lake - Sun River	2	5	2	9	Two-Calf Creek, Sheep Past., Fergus Co.	(9)
1959	Gibson Lake - Sun River	4	9		13	Eddy Creek, Sanders Co.	(10)
1959	Wild Horse Island	1	5		6	Thompson River, Sanders Co.	(10)
1959	National Bison Range	9	4		13	Two-Calf Cr., Sheep Past., Fergus Co.	(9)
1960	National Bison Range	untagged		34	34	Stickney Creek, Lewis & Clark Co.	(7)
1960	National Bison Range	untagged		11	11	Two-Calf Cr., Sheep Past., Fergus Co.	(9)
1960	Scattering Springs - Sun River	1	2		3	Sheep Creek, Cascade Co.	(7)

Table 1. Source, sex composition and release locations of mountain sheep transplants in Montana - 1942-1975 (continued).

Year	Trapsite	Male	Fem.	Unc.	No. Sheep Transplanted	Release Location and Number
1961	Scattering Springs - Sun River	4	7	1	12	Two-Calf Cr., Sheep Past., Fergus (9)
1962	Gibson Lake - Sun River	5	13		18	Sheep Creek, Meagher Co. (11)
1963	National Bison Range	5			5	Kootenai River, Lincoln Co. (*)
1963	National Bison Range	6			6	West Fork, Gallatin R. Gall. Co. (*)
1963	National Bison Range	6	8		14	Doris Mountain, Flathead Co. (12)
1964	Hannan Gulch - Sun River	6	19		25	Willow Cr., near Pony, Madison Co (13)
1967	Scattering Springs - Sun River	5	16		21	Highland Mountains, Madison Co. (14)
1967	Ford Creek - Sun River	5	20		25	Olson-Foster Cr., Deer Lodge Co. (15)
1968	Gibson Lake - Sun River	5	27		32	Sieben - Lewis & Clark Co. (16)
1968	Gibson Lake - Sun River	2	-		2	Stillwater Canyon, Stillwater Co. (*)
1968	Castle Reef - Sun River	3	13		16	Petty Creek, Missoula Co. (17)
1968	National Bison Range	6	9		15	Teakettle Mtn., Flathead Co. (18)
1969	Scatter.Springs - Sun River	3	15		18	Highland Mountains, Madison Co. (14)
1969	Scatter.Springs - Sun River	4	19		23	Berray Mountain, Lincoln Co. (19)
1969	Scatter.Springs - Sun River	1	12		13	Highland Mountains, Silver Bow Co. (14)
1970	Castle Reef - Sun River	2	-		2	Stillwater Canyon, Stillwater Co. (*)
1971	Castle Reef - Sun River	9	26		35	Pryor Mountains, Carbon Co. (20)
1971	Ford Creek - Sun River	2	3		5	Beartooth G.R., Lewis & Clark Co. (1)
1971	Castle Reef - Sun River	10	26		36	Beartooth G.R., Lewis & Clark Co. (1)
1971	Ford Creek - Sun River	1	5		6	Beartooth G.R., Lewis & Clark Co. (1)
1971	National Bison Range	2	-		2	Beartooth G.R., Lewis & Clark Co. (*)
1972	Gibson Lake - Sun River	6	13		19	East Fork Bitterroot, Ravalli Co. (21)
1972	Castle Reef - Sun River	5	11		16	East Fork Bitterroot, Ravalli Co. (21)
1972	Ford Creek - Sun River	3	18		21	Little Rockies, Phillips Co. (22)
1973	Castle Reef - Sun River	1	4		5	Beartooth G.R., Lewis & Clark Co. (1)

Table 1. Source, sex composition and release locations of mountain sheep transplants in Montana - 1942-1975 (continued).

Year	Trapsite	Male	Fem.	Unc.	No. Sheep Transplanted	Release Location and Number
1974	Gibson Lake - Sun River	8	19		27	Pryor Mountains, Carbon Co. (20)
1974	Castle Reef - Sun River	9	12		21	Little Rockies, Phillips Co. (22)
1974	Castle Reef - Sun River	9	9		18	Pryor Mountains, Carbon Co. (20)
1975	Gibson Lake - Sun River	10	21		31	Rock Creek, Granite Co. (23)
1975	Ford Creek - Sun River	1	15		16	Berray Mountain, Lincoln Co. (19)
1975	Homes Gulch - Sun River	4	11		15	Berray Mountain, Lincoln Co. (19)
1975	Homes Gulch - Sun River	2	9		11	Beartooth G. R., Lewis & Clark Co.(1)
1975	Homes Gulch, Ford Creek Sun River	untagged		49	49	Beartooth G. R., Lewis & Clark Co.(1)
1975	Wild Horse Island	2	-		2	Berray Mountain, Lincoln Co. (19)
	Total	219	468	108	795	

(*) Mixing rams among sheep herds not considered a sheep transplant.

Figure 1. Locations of bighorn sheep transplanted in Montana, 1942-1975.

Table 2. Status of mountain sheep transplants, July 1975.

Location Number	Location of Transplant	No. of Sheep
Established Transplants:		
2	Wild Horse Island, Lake County	6[1/]
5	Kootenai Falls, Lincoln County	14
8	Blue Mountains - Breaks, Custer County	13
9	C. M. Russell Sheep Pasture, Fergus County	31
10	Eddy Creek, Sanders County	19
14	Highland Mountains, Madison and Silver Bow Counties	53
15	Olson-Foster Creek, Deer Lodge County	25
20	Pryor Mountains, Carbon County	79
21	East Fork Bitterroot, Ravalli County	35
Unsuccessful to date:		
3	Billy Creek, Garfield County	16
4	Sixteen Mile, Gallatin County	15
6	Bull Mountain, Jefferson County	21
7	Sheep Creek, Cascade County	21
11	Sheep Creek, Meagher County	18
12	Doris Mountain, Flathead County	14
18	Teakettle Mountain, Flathead County	15
Apparently Unsuccessful to date:		
13	Tobacco Roots, Madison County	25
16	Sieben-Prickly Pear Creek, Lewis & Clark County	34
Success Undetermined as yet:		
1	Beartooth Game Range (Gates of Mtns.) Lewis & Clark Co.	56
17	Petty Creek, Missoula County	16
19	Berray Mountain, Sanders County*	56
22	Little Rockies, Phillips County	42
23	Rock Creek, Granite County	31

* Some stability evident -- sheep still remain in area and winter each year on same range.

1/ Original transplant in 1939, consisting of two sheep, male and female yearlings captured as lambs in the South Mission Mountains.

Region Four

Sun River-Teton	Native
Dearborn	Native
Sheep Creek (Cascade County)	Transplant
Gates of the Mountains	Transplant
Sheep Creek (Meagher County)	Transplant
Judith River	Transplant (Meagher County)
Two-Calf Creek	Transplant

Region Five

Stillwater-Absaroka	Native
Pryor Mountains	Transplant

Region Six

Little Rockies	Transplant

Region Seven

Blue Mountains	Transplant

Several areas, other than these listed, have been planted with sheep, but as far as is known, a population was not established. In most instances, no hunting was permitted in those areas where the introductions failed. Such failure could indicate the absence or presence of a feature, not readily detectable in the habitat, which prohibits the establishment of a sheep population. This possibility also exists in areas where hunting is permitted.

HUNTING SEASON, 1974

Of the 36 or so locations of sheep in Montana, 16 of these herds or groups were hunted under permit during the 1974 hunting season (September 1-November 24) as follows:

Sheep Herd	Hunting District	1974 Season Number of Permits
Ural Tweed Kootenai Falls	100	5 3/4-curl ♂
Cabinet Mountains Thompson River	121	5 3/4-curl ♂
Olson-Foster Creeks	213	5 3/4-curl ♂ 5 adult ♀
West Fork of the Bitterroot	250	5 3/4-curl ♂
Madison Range (Sheep Creek & Rock Creek Upper Madison (Reynolds Pass) Spanish Peaks Hyalite Peak Upper Tom Miner	301	Unlimited 3/4-curl ♂
Highland Mountains	340	15 either-sex
Sun River-Teton	420	40 either-sex 20 adult ewes
Stillwater-Absaroka	501	Unlimited 3/4-curl ♂
Blue Mountains	760	2 either-sex

HUNTING SEASON, 1975

Several hunting districts were redescribed for the 1975 mountain sheep hunting season. Hunting district 100 was made smaller, 420 was divided into

four hunting districts for closer management, and 501 was divided into three. In addition, harvest quotas were imposed on hunting district 301 and the new hunting districts 500, 501 and 502.

Some changes in hunting season dates were also imposed. The following resume lists pertinent information about the 1975 season.

Sheep Herd	Hunting District	Season Dates	1975 Season Permit and/or Quota Numbers
Kootenai Falls	100	9/15 - 11/23	5 3/4-curl ♂ permits
Cabinet Mountains Thompson River	121	9/15 - 11/23	5 3/4-curl ♂ permits and 5 adult ♀ permits
Olson-Foster Creeks	213	9/15 - 11/23	5 3/4-curl ♂ permits and 5 adult ♀ permits
West Fork Bitterroot	250	9/15 - 11/23	5 3/4-curl ♂ permits
Madison Range (Sheep Cr. & Rock Creek) Upper Madison (Reynolds Pass) Spanish Peaks Hyalite Peak Upper Tom Miner	301	(9/1 - until (closed but no (later than (11/2	15 3/4-curl ♂ harvest quota
Highland Mountains	340	9/15 - 11/23	15 either-sex permits
Sun River (Deep Creek)	421	9/15 - 11/23 10/19 - 11/23	10 either sex permits 35 adult ♀
Sun River (Castle Reef)	422	9/15 - 11/23 10/19 - 11/23	10 either-sex permits 20 adult ♀
Sun River (Gibson Lake North)	423	9/15 - 11/23 10/19 - 11/23	10 either-sex permits 45 adult ♀
Sun River (Ford Creek)	424	9/15 - 11/23 10/19 - 11/23	10 either-sex permits 15 adult ♀
Stillwater-Absaroka (Stillwater)	500	9/15 - until closed but no later than 11/23	4 3/4-curl ♂ harvest quota
Stillwater-Absaroka (Cooke City)	501	9/15 - until closed but no later than 11/23	5 3/4-curl ♂ harvest quota
Stillwater-Absaroka (Hellroaring)	502	9/15 - until closed but no later than 11/23	4 3/4-curl ♂ harvest quota

MANAGEMENT

The rationale for Montana's Rocky Mountain bighorn sheep management program is based on the following criteria:

1. In all wild animal populations, more young are produced than will survive with or without a hunting season; a harvestable segment of the population is available each year.

2. Quality and quantity of habitat have a great influence on survival, population size and reproductive performance.

3. Big game populations have the potential of deteriorating their food supply, and ultimately reducing their own numbers.

4. Sport hunting is an altogether legitimate and biologically sound method of annually removing the harvestable segment of the population to maintain the population commensurate with its food supply.

In 1895 the mountain sheep season in Montana was open from September 1 through January 1, (1896) with a bag limit of eight mountain sheep, as well as a number of other big game. In 1915 hunting seasons on bighorns were closed and remained so until 1953. The following comment appeared in the Fish and Game Commission's 1935-36 Biennial Report:

> "While there are quite a number of sheep in Gallatin and Sun River areas, they are not showing proper increase...It is entirely possible that being confined to rather limited areas, in-breeding or the presence of older animals which are now taken only by old age, disease or predators are factors..."

After thirty-eight years of closed seasons, the sheep did not increase as expected. Obviously there are factors other than hunting that control sheep populations.

As Buechner (1960) stated, "Therefore it must be concluded that forces other than hunting are operating adversely on the bighorn sheep," when he considered sheep in present times. It is interesting to note that both

bighorns and bison (buffalo) have a closely related "domestic counterpart." Parasitism seemed also to have a more profound or deletrious effect on bighorns than on other wild, free-roaming animals.

The location of all the hunting districts for bighorn sheep hunting seasons held in Montana since 1953 is presented in Figure 2. One area had only two hunting seasons (Billy Creek in Garfield County), while others have had over twenty years of hunting. One area (Highlands - between Butte and Dillon) has had either-sex only seasons since it was initiated in 1970. The bighorn hunting seasons held in Montana in 1974 and 1975 are presented in Figures 3 and 4.

A consideration of the management program by hunting district within each administrative region follows:

REGION ONE

Kootenai-Eureka (Ural-Tweed) - Hunting District 100

Region One's first hunting season since the general statewide closure of 1915 was held in 1954. The hunting area was east of the Kootenai River. In 1957 the area was expanded to include all of Lincoln County and the west-central portion of Flathead County. Data pertinent to these hunting seasons is given in Table 3.

Brink (1941) stated, "...several local residents were interviewed...to determine whether...this /Ural-Tweed/ was ancestral range of the bighorn. Mr. Oscar Gibler...came to the area in 1886, says "...mountain sheep...more numerous at that time than at present." Several others who came during the first decade of the present century state that sheep were here, but vary in their concepts of the numbers then in comparison with numbers now..." The latter

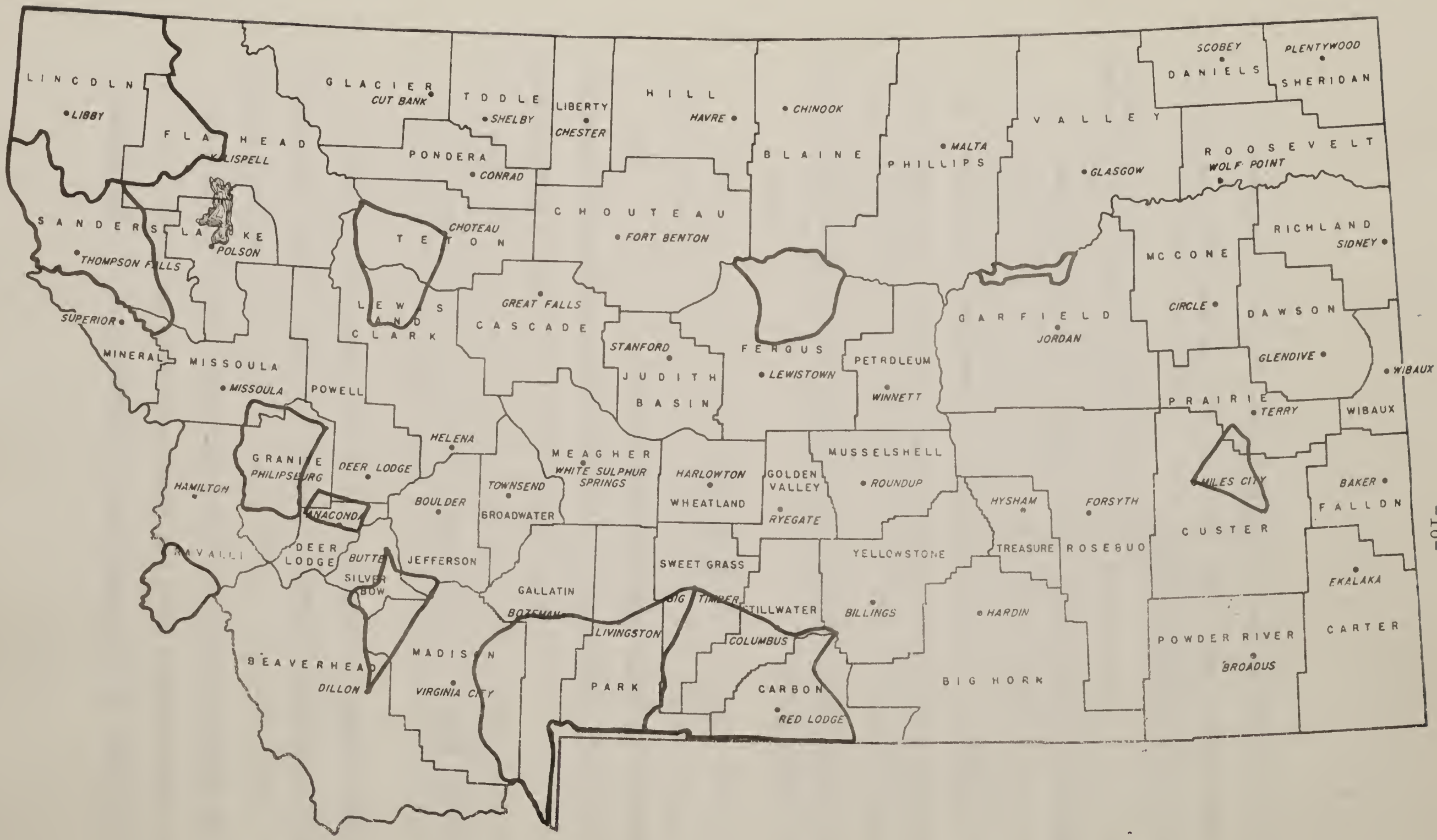

Figure 2. Location of all hunting districts for bighorns from 1953 to 1975, with maximum size of the hunting district shown.

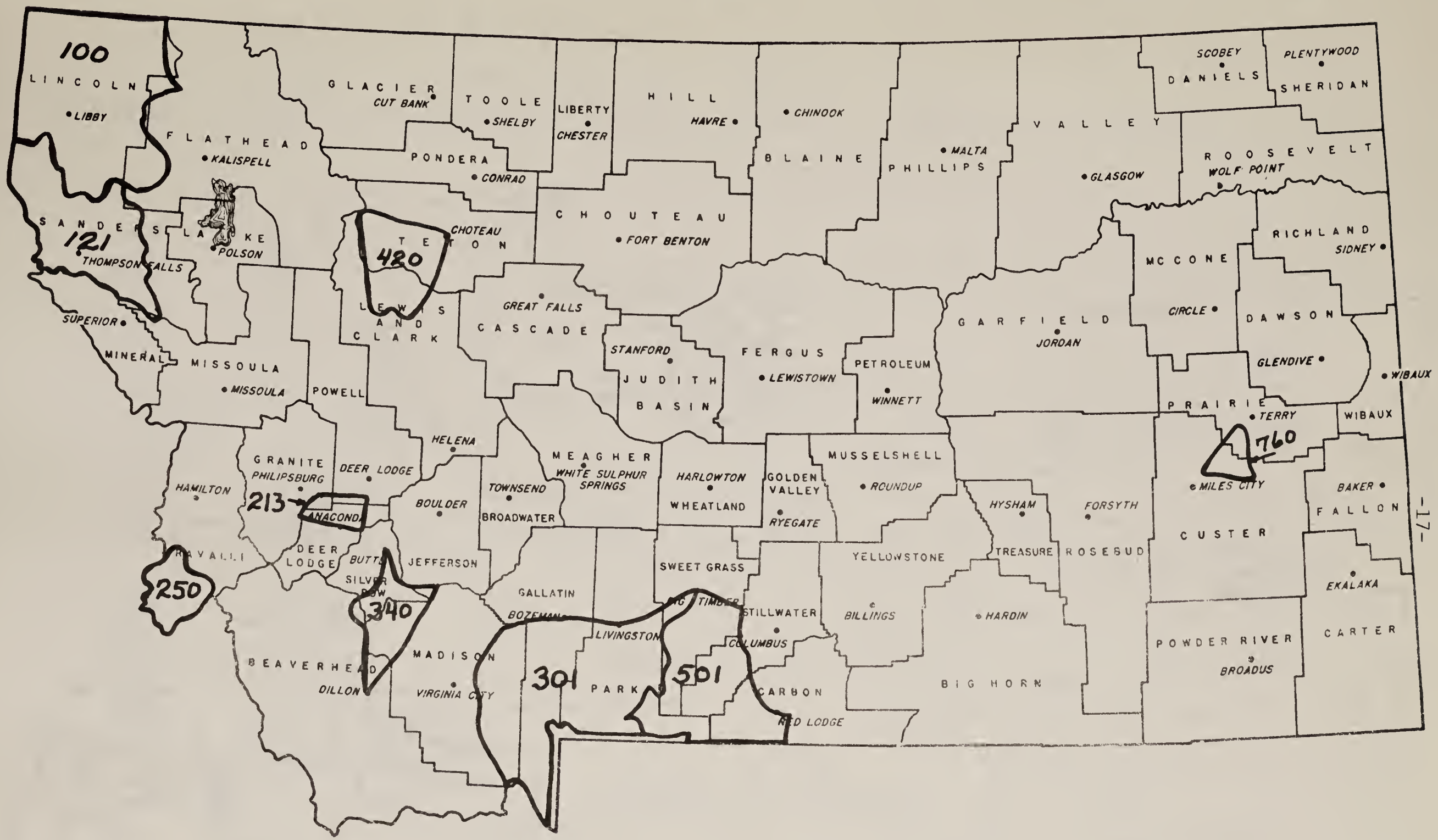

Figure 3. Locations of bighorn sheep hunting districts 1974.

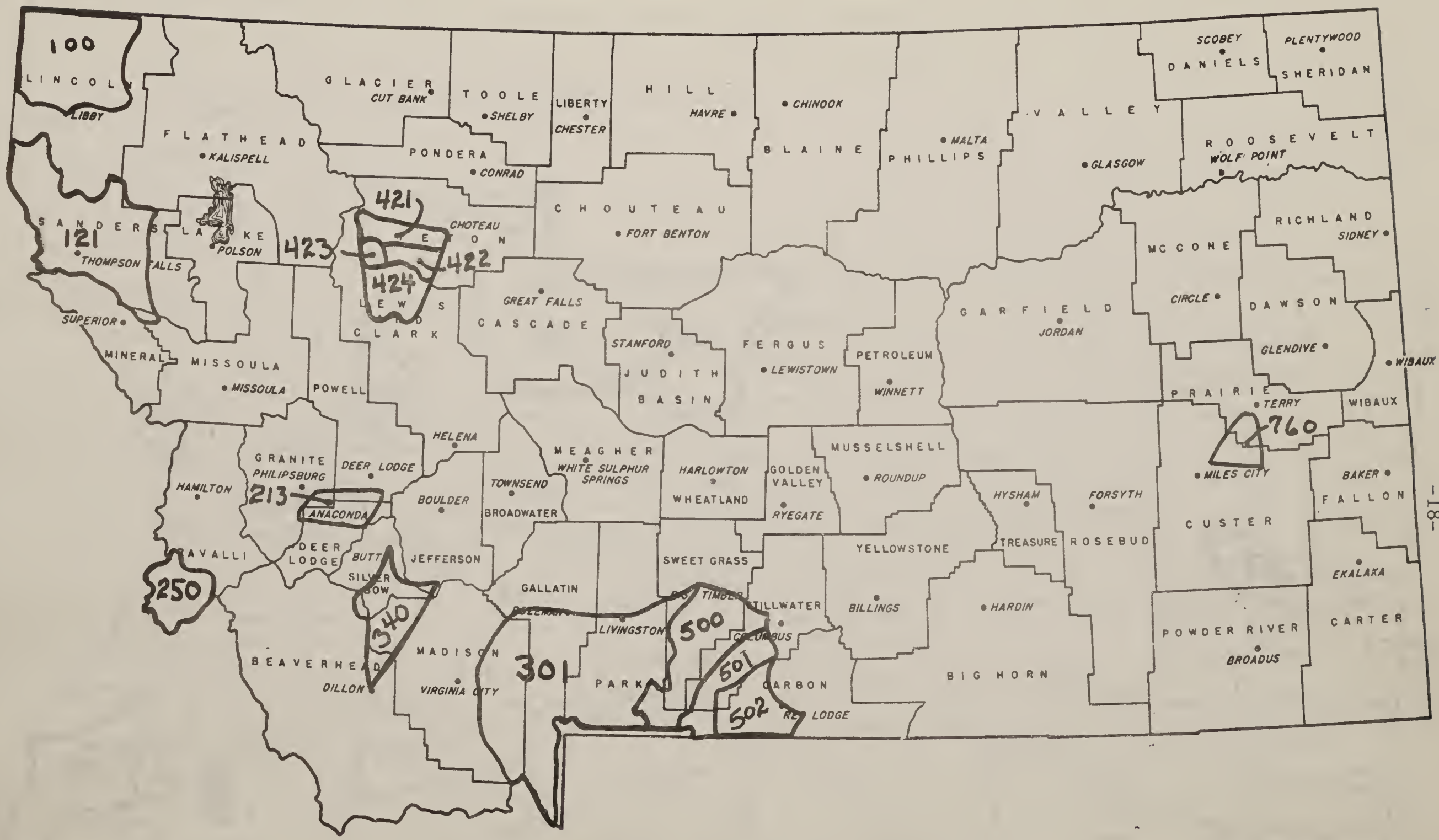

Figure 4. Locations of bighorn sheep hunting districts 1975.

Table 3. Region one bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
		KOOTENAI-EUREKA (URAL-TWEED) (Hunting District 100 on 1974 Hunting Map)				
1954	204	5	-	-	3	-
1955	204	5	-	-	2	-
1956	202	10	-	-	2	-
1957	10	10	10	8	4	Area enlarged
1958	10	20	-	20	6	-
1959	10	20	20	18	6	-
1960	10	30	30	28	8	-
1961	10 & 101	30	30	27	7	Area subdivided
1962	10 & 101	30	30	30	10	Six rams from Kootenai Falls area
1963	10 & 101	30	30	25	7	-
1964	10 & 101	30	30	27	7	-
1965	10 & 101	30	30	30	6	-
1966	10 & 101	30	30	27	0	Kootenai Falls area producing greatest harvest
1967	10 & 101	10	10	8	1	-
1968	10 & 101	10	5	5	2	-
1969	10 & 101	5	5	5	1	-
1970	10 & 101	5	5	5	1	-
1971	10 & 101	5	5	4	4	-
1972	10 & 101	5	5	5	4	-
1973	100	5	5	5	1	-
1974	100	5	5	5	5	-
		CLARK FORK (THOMPSON FALLS) (Hunting District 121 on 1974 Hunting Map)				
1968	12	3	3	3	3	-
1969	12	3	3	3	3	-
1970	12	3	3	3	3	-
1971	12	5	5	5	4	-
1972	12	5	5	5	5	-
1973	121	5	5	5	5	-
1974	121	5	5	5	5	-

*3/4-curl rams.

sentence would indicate that "testimony" from "old timers" regarding abundance (or absence) of game may not be absolutely and unquestionably accurate.

Couey (1950) stated, "These sheep are located on the east side of the Kootenai River between Warland and Sutton and range as far east as the Divide (of the Salish Mountains). There are approximately 125 sheep in this group, which is less than there were fifty years ago according to old-timers. The 1946 estimate for the Ural-Tweed sheep was 150 head. Lungworms are common, as shown by fecal analysis."

Weckwerth (1974) considers the sheep herd in hunting district 100 to consist of two segments. One is a native population along the face of the Kootenai River (Ural-Tweed Herd) from Cripple Horse Creek north to stonehill on the east side of the river. This population is being exposed to stress derived from the construction of Libby Dam and Highway 37. One highway-killed sheep was recorded in 1974 soon after the east side highway was completed. (A sheep study is proposed for this herd.) Specific information is needed to assess the effects of the highway and dam construction as well as logging, and the possibility that historic lambing areas have been lost due to these habitat-altering factors. This population could continue to suffer whether hunted or not. It is interesting to note that few sheep have been harvested by hunters since 1966, indicating hunting has not been a factor in their decline. Forest succession and other habitat losses have also had an effect on this herd. This sheep herd competes with small elk bands, and mule and whitetail deer. Domestic livestock are also grazed on some portions of this sheep range.

The other segment of this herd is in the vicinity of Kootenai Falls below Libby. This herd is the result of a transplant and presently (since about 1966) furnishes the bulk if not all the trophy harvest in hunting district 100. As with all wildlife populations, it is very difficult if not impossible to estimate the size of the population. It spends most of its time on national forest, coming down to private land in spring and early summer. This caused considerable trouble with a landowner (Bitterman) who has since sold his property to another private landowner. This land is a high priority to purchase with any mitigation money from Libby Dam. Checks of this population last winter (1973-74) indicated a lamb/ewe ratio of 56/100. In the 160 sheep observations there also appeared to be 8-10 legal rams.

The Kootenai Falls sheep compete with deer and a few elk for food and space. The access for hunting this population is limited to the area along the river, and depends on the present landowner's frame of mind. This makes hunting difficult and consequently results in a somewhat lower hunter success. If the Department owned this access, a more direct management program could be implemented perhaps including the taking of ewes from this herd.

Clark Fork (Thompson Falls) - Hunting District 121

From a bighorn study just completed in Sanders County (Brown 1974), there are two different herd segments in this population for ewes and lambs with an interchange of rams between both. The Thompson River acts as sort of a division line for the ewe/lamb segments of the populations. He also states that this is a thrifty, young, short-lived population with a fast turnover. Eight-year old rams seem to be about as old as he could find,

using horn segment annulus counts as the age criterion. Rams become legal 3/4-curl at 4-1/2 years of age in this population. Lungworm incidence was endemic but not high. Sheep are presently not competing with a high population of elk or deer, and domestic livestock do not present important competition for food on national forest lands. Predation is not a factor as the lamb cohort he was watching experienced little or no mortality over the winter.

Brown (op. cit.) described the Thompson Falls bighorn population as a healthy population that is expanding and that unless other than trophy animals are removed (by hunting) a future population crash seems probable.

In his management recommendations he suggested that a small yearly harvest of ewes and/or lambs should be taken from the population to keep it within the carrying capacity of the range. Lamb/ewe ratios (1974) were 80 lambs/100 ewes in this herd. Hunting success has been 100 percent every year there has been a season except one when only 4 of 5 ram permits were filled (Table 3). Rams harvested have been mostly in the four and five-year classes.

This is a transplanted herd; the native sheep apparently were eliminated by the late 1940's and sheep from Sun River and Wild Horse Island were transplanted to Munson Creek in 1959. They thrived and have increased to about 240 animals based on Lincoln index estimate. They have extended their range to encompass about all of the available sheep habitat, and on the basis of Brown's work, we believe they should continue to be hunted to keep the population in their present thrifty condition and in balance with the range.

During the fall of 1974, two yearling male bighorns were observed at Somers, Montana. One of these was marked with a braided collar and a numbered pendant. This sheep was identified as one marked by Brown on the Thompson Falls sheep range. This movement was approximately 55 airline miles from the trap site.

Sheep are also present on Berray Mountain in the western end of this hunting district. They were transplanted into this area in 1969. Even though this population is located within an area open to hunting, they receive virtually no hunting pressure. Observations during the winter of 1974 showed the presence of 10 lambs and numerous young rams, indicating that they are reproducing successfully.

In summing up the situation, we believe the Thompson and the Kootenai Falls sheep herds should both be hunted. They are herds that have propogated through transplanting and could possibly go out of the picture through catastrophic reasons like other North American sheep populations have done in the past. Hunting is the most efficient and economic tool for keeping these populations in balance with their food supply.

Future management of the herd in the Warland-Stonehill area may be in doubt. Few sheep have been shot there since 1966, so hunting has not been a factor in the decline of the population. We believe forest succession and stress brought about by loss of habitat and human disturbance to be the major decimating factors in the well-being of this population.

Changes in habitat and land use could be much more damaging to these sheep populations than hunting. With controlled hunting such as has been the program in Region One, there is no reason to curtail sheep hunting in this region.

There seems to be few other places in Region One, where sheep can survive. Buechner (op. cit.) surmised that limited winter range and high snowfall seem to exclude the possibility of a sheep population historically and at the present in most of the Cabinet Mountains.

Wild Horse Island

The Wild Horse Island sheep herd has been the subject of studies by Ogren (1954), Woodgerd (1964), and Matthews (1973). This sheep herd has also been discussed by Couey (op. cit.), Buechner (op. cit.), Weckwerth and Cross, 1969, 1971a and 1971b. Although this population has not been subjected to hunting, it has been and is currently being considered for some type of management program.

This herd at least in recent times evidently started with the introduction of two yearling bighorn sheep (1 male, 1 female) on the island in 1939. They increased to six by 1947, and at that time six more sheep from the Sun River were transplanted by the Montana Department of Fish and Game.

The population size was estimated to be about 90 sheep in 1954 when the first study on the island was completed; Ogren (op. cit.). In addition, about 100 horses and 300 mule deer inhabited the area. Range conditions were poor. Horses, deer and sheep died during the winter periods of the years 1954-1955 and 1956.

Woodgerd (op. cit.) estimated that in 1963 the sheep population was approximately 125, with about 200 mule deer, indicating a reduction in the deer population. Only three horses were present at this time. Observed lamb production was 33 lambs/100 ewes in 1961.

Matthews' (op. cit.) study revealed an all-time high bighorn sheep population of approximately 300. At this time the deer population was estimated at 75 and most all deciduous browse species were gone. Only one horse and one mule remained on the island. The sheep population suffered losses during the winter of 1972 when 58 dead sheep were found. Examination of carcasses

revealed that malnutrition was a major cause of the die-off. Range forage plants were over-utilized and the spring lamb survival was only 12 lambs/100 ewes.

The sheep population was reduced by natural causes to approximately 200 and the deer population now appears to be less than the 75 recorded in 1972. No recent counts have been made, but it appears that lamb survival is low as very few are presently observed on the island.

Following the most recent sheep loss, the present owners of Wild Horse Island became concerned and contacted the Montana Department of Fish and Game to help manage the sheep numbers on the island. An agreement was reached whereby the State would trap and transplant surplus sheep to acceptable areas within the State of Montana.

Although only three sheep have been trapped and removed from the island since 1959, it is probably a conservative estimate that several hundred sheep (172 can actually be accounted for) have been removed from this population. Trapping accounts for only 50. Virtually all the remainder have been removed by starvation. When we view hunter harvest removals from the other major herds, it is difficult to imagine hunting as a detrimental factor to mountain sheep populations.

The following quote from Buechner (op. cit.) seems to sum up the situation very well..."It is not good, sound thinking to believe preservation of native animals requires complete abstinence from hunting. Overpopulations are possible, and a sensible program of harvest is necessary as a technique to prevent catastrophic mortalities. There is no more dramatic illustration of the fallacy of rigid protection than the collapse of the Tarryall /Colorado/ herd. Had the population density been kept at about half its maximum peak,

the catastrophe might have been averted. General principles of population behavior suggest that it is correct to recommend that density be kept below the maximum in habitats where overpopulations develop. Keeping a bighorn sheep herd at the right level requires harvesting individuals of both sexes."

Although it is not the intent here to consider whether or not hunting should be allowed on Wild Horse Island, it does seem apparent that some type of program designed to remove the harvestable segment of the bighorn population from the area is not only desirable but necessary. It is not likely that any other bighorn population in Montana would be any different, although the magnitude of the population and/or harvest may differ from area to area. In addition, when we see that the known hunter harvest from the hunted sheep herds in Administrative Region One is around 100 (105 from hunter questionnaire) and that these herds are still maintaining themselves, we further establish that hunting does not seem to be the limiting factor. As a matter of fact, some sort of program to affect an orderly systematic removal of a part of the population each year is beneficial rather than detrimental. Sport hunting is an altogether legitimate and sound method to accomplish such removal.

REGION TWO

Rock Creek - Hunting District 210 (1968)

An account of the history of this bighorn sheep population is covered by Aderhold (1968) and Berwick (1968). Apparently bighorns were plentiful in this area prior to 1895, but were considered scarce in the 1920's. Couey

(op. cit.) mentions, "A group of 40 sheep is reported from the head of Rock Creek..." While Buechner (op. cit.) stated, "...on December 21, 1954, at which time at least 56 sheep were seen, including...10 to 15 lambs." However, at this time Buechner (op. cit.) also indicated "Professor P. L. Wright, Montana State University...concluded that the population was greater than indicated by the count." According to Berwick (op. cit.), "The population of bighorn sheep decreased from nearly 200 individuals in the early 1960's to about 15 today."

The herd apparently quadrupled from the 1950's to the 1960's during which time the indicated hunter harvest (Table 4) was approximately 60 sheep, two-thirds of which were taken via either-sex sheep permits. It is difficult to imagine that from 1964 to 1967 the issuance of five permits for each of those four years was responsible for or could have triggered the decline in this bighorn population.

The last hunting season held in the area was 1967 when five either-sex permits were issued. Although a season was initially scheduled for 1968, it was cancelled and none of the five either-sex permits proposed were issued.

The indicated hunter harvest in the Rock Creek area for the 14 hunting seasons from 1954 to 1967 was 66 (Table 4). Even though all sheep hunting was closed in Montana from 1915 to 1953, and the Rock Creek sheep population was not legally hunted for nearly 40 years, yet the population did not materially increase in the absence of hunting.

In view of the existing information, it appears that deterioration of habitat was the major cause for the decline of this bighorn population.

Hartkorn (1969) recommended, "Special permits for mountain sheep be discontinued in the unit until sheep numbers increase." Until such time

Table 4. Region two bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
		ROCK CREEK (Hunting District 210 on 1968 Hunting Map)				
1954	205	5	5	5	5	
1955	205	5	-	-	2	
1956		No season				
1957		No season				
1958	220	5	5	5	5	
1959		No season				
1960	220	4	4	4	4	
1961	220	5 + 5 ES	10	10	10	
1962	220	25 ES	25	25	19	
1963	220	10 ES	10	10	10	6♂ 1♀ 3 unknown
1964	220	5	5	4	3	
1965	220	5	5	5	3	
1966	220	5 ES	5	5	4	
1967	220	5 ES	5	5	1	
1968	210	5 ES	0	0	0	1♂
1969-1974	-	No season				
		SOUTH FLINT RANGE (Hunting District 213 on 1974 Hunting Map)				
1973	213	5	5	5	4	
1974	213	5 + 5 Ewes	10	10	8	

Table 4. Region two bighorn sheep harvest (continued).

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
		WEST FORK OF BITTERROOT (Hunting District 250 on 1974 Hunting Map)				
1964	25	3	3	3	2	
1965	25	5 ES	5	5	2	
1966	25	5 ES	5	5	1	
1967	25	3 ES	3	3	1	
1968	25	5 ES	5	4	3	
1969	25	5 ES	5	5	0	
1970	25	5 ES	5	5	4	
1971	25	5 ES	5	4	1	
1972	25	5	5	5	1	
1973	250	5	5	5	0	
1974	250	5	5	5	3	

* 3/4-curl rams except those noted as either-sex or ewes.

that improvements occur in the habitat - increases in the population are not likely, even without hunting.

South Flint Range - Hunting District 213

This herd was established as the result of a transplant (25 sheep) made into the area in 1967. From 40-60 sheep were reported for the years 1971 and 1972 on the winter range portion of the area. A group of 14 rams was observed in Lost Creek in the spring of 1973, and up to 80 sheep were observed on the winter range in 1974. There are both high summer and low winter ranges available to these sheep and forage is adequate.

To date four sheep (Table 4) have been removed from the area by hunting.

These sheep seem to be doing quite well. The annual removal (via hunting permits) may need to be increased if the population is to be maintained and perpetuated in its present healthy status.

As Buechner (op. cit.) stated, "...a sensible program of harvest is necessary as a technique to prevent catastrophic mortalities."

West Fork of the Bitterroot - Hunting District 250

A recap of the history of the Bitterroot by Hartkorn (1967) states, "The expeditions of Lewis and Clark in 1805-06 and Alexander Ross in 1823-24 recorded that deer, elk, and bighorn sheep were abundant in the Bitterroot Valley."

In August of 1954, during a 20-mile horseback trip, nine bighorns were observed in the Watchtower-Sheepshead (Creeks) area of the West Fork of the Bitterroot. In August of 1958 no sheep were observed in the area during a similar trip. (Hartkorn, 1959)

Hartkorn (op. cit.) however indicated that "Mountain sheep are present /in 1966/ in small numbers in the West Fork /of the Bitterroot/ and a few have been occasionally observed in the East Fork and Burnt Fork areas /of the Bitterroot/."

A population of at least 50 sheep occurred in the Watchtower-Sheepshead Creeks drainage in the fall of 1970 (Firebaugh, 1971).

There is a strong implication here that after hunting had been initiated (1964), even though on a very limited basis -- five permits for 3/4-curl rams -- the population did not decline and perhaps even showed signs of increasing!

Table 4 indicates the hunter harvest from this area to date.

East Fork of the Bitterroot

Although hunting has not been initiated in this area to date, it is worth noting that 35 sheep were planted here (Table 1) in 1972. Twenty-four sheep were observed in the Bunch Gulch area of Sula Basin in the spring of 1972 and in January of 1973. It is intended that when these sheep number approximately 35 on the winter range, limited permit hunting would be recommended.

REGION THREE AND FIVE

Madison-Gallatin-Absaroka and Sweetgrass - Hunting Districts 301-501

The complex of mountains lying generally east of the Madison River, south of U. S. Highway 10 (and I-90) and the Yellowstone River, and U. S. Highway 310 in Montana contain several bighorn populations. The area is comprised largely of portions of both the Gallatin and Custer National Forests, as well as a small part of Yellowstone National Park. Major

mountainous areas included are the Hilgards, Spanish Peaks, Beartooth Plateau and Absaroka Range.

Couey (op. cit.) made the following comments about the four major sheep concentrations he recognized in this area:

> "Hilgard Herd. About 25 sheep...near Hebgen Dam...in 1943...
>
> West Gallatin Herd. Some..winters on West Fork and summers on the Spanish Peaks. Some...also found in...Sage Creek. ...about 60 sheep in Gallatin area.
>
> Gardiner Herd. ...really the Yellowstone Park group...about 100 sheep in this band.
>
> Absaroka Range Sheep. ...several small groups...totaling about 225 head...about 10 winters on...East Rosebud...West Rosebud...about 40 between Emerald Lake and Mystic Lake. The power company caretaker at Mystic Lake has observed this group /the 40/ for 18 years and its numbers have remained about the same. On the Stillwater and Boulder Rivers...an estimated...175 sheep, the majority...winter...near the Mouat...mine..."

Nineteen hundred fifty-three marked the first year since 1915 that a bighorn sheep season was held in Montana and three areas were opened to hunting. Area 1 was in the Spanish Peaks south of Bozeman and Area 2 was in the Absaroka or Upper Stillwater southwest of Columbus. Area 3 (Sun River) will be discussed elsewhere in this report. In 1956, a single larger area, which encompassed both Area 1 and Area 2, was open to hunting of bighorns.

From 1953 through 1955, two basic sheep populations, those in the Spanish Peaks and Upper Stillwater, were recognized for hunting purposes (Table 5). Starting with the fall hunt of 1956 and continuing through and including 1974, all sheep populations within the area described (Madison River-Yellowstone River-U. S. Highway 310) were subjected to hunting. However, the populations occurring in the Spanish Peaks and Upper Stillwater apparently received the bulk of the hunting pressure.

Table 5. Region three and five bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters 1/ Actually Hunting	Harvest Estimate	Remarks
		MADISON - GALLATIN - ABSAROKA and SWEETGRASS (Hunting District 301-501 on 1974 Hunting Map)				
1953	(1	5	-	-	-	Season 10/15-11/15 in a
	(2	5	-	-	-	small area
1954	201	15	15	-	9	
	202	8	-	-	-	
1955	201	15	-	-	-	1 sheep checked through
	202	8	-	-	-	Gallatin check station
1956	201	Unlimited	-	-	24 (?)	Includes both 301 & 501
1957	201	Unlimited	-	145	24	Includes both 301 & 501
1958	201	Unlimited	237	237 (?)	23	Includes both 301 & 501
1959	301	Unlimited	267	212 (?)	23	Includes both 301 & 501
1960	301	Unlimited	339	243	13	Includes both 301 & 501
1961	301	Unlimited	300	187	23	Includes both 301 & 501
1962	301 301.1	Unlimited)	361	271	23	East part of area separated
1963	301 301.1	Unlimited)	438	400	36	
1964	301 301.1	Unlimited)	417	277	24	
1965	301 501	Unlimited)	468	189	26	

Table 5. Region three and five bighorn sheep (continued).

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters 1/ Actually Hunting	Harvest Estimate	Remarks
		MADISON - GALLATIN - ABSAROKA and SWEETGRASS continued (Hunting District 301-501 on 1974 Hunting Map)				
1966	301+301.1 &	Unlimited)	488	281	25	Small area in 301 with shorter season. Attempt made to separate kill by H.D.
	501	)			7	
1967	301+301.1 &	Unlimited) + 10 ES)	193	145	8	Small area in 301 with short season ES and 3/4-curl.
	501	Unlimited)			4	3/4-curl only.
1968	301	Unlimited)	250	162	4	
	501	)			9	
1969	301	Unlimited)	279	241	15	
	501	)			2	
1970	301	Unlimited)	451	447 (?)	31	Harvest combined.
	501	)				
1971	301	Unlimited)	490	308	18	
	501	)		144	22	
1972	301	Unlimited)	529	329	28	
	501	)		245	22	
1973	301	Unlimited)	740	417	13	
	501	)		337	22	
1974	301	Unlimited)	868	438	21	
	501	)		338	33	

1/ For the years 1969 and prior years, the figures represent the number of licensees who hunted in the area encompassed by both hunting districts.

For the years 1971 and after, the figures represent the number of licensees of the total licensees who hunted in the individual hunting district. The actual number of licensees who hunted of the total licensees, is unknown.

* 3/4-curl rams except those noted as either-sex.

From 1956 to 1974, both areas have, for hunting purposes, been treated as one hunting district in that permits sold for either area are valid in the other. In fact, the permit carries the notation that the permit is valid in Hunting Districts 301-501. Although since 1956, the number of permits issued have been unlimited, an average of only seven percent (based on 16 years) of these permit holders have harvested a sheep (a high of 11 percent and a low of 4 percent). Over the 21-year period (1953-1973) this area has been open to hunting approximately 478 bighorns have been legally taken by hunters. With the exception of one year (1967) all bighorn licenses issued for the area (301-501) were for 3/4-quarter curl rams.

Even if the estimate of legal kill was low, and if the illegal kill (of 3/4-curl rams) equaled the legal kill, an annual removal of (3/4-curl rams) of such magnitude would probably not materially reduce the overall sheep population. Taber (1971), in describing variations in patterns of population dynamics of populations subjected to different intensities of cropping (none to heavy) stated, "But killing part of a population only improves reproduction and survival for the rest. We may even kill a very high proportion, especially if we concentrate on males, and have more than ever. Suppose that elephants in East Africa damage crops and are controlled by shooting. If the shooters chivalrously spare the cows and concentrate on bulls, they will shift the sex ratio toward a greater proportion of cows. The population will consequently have a larger annual calf crop, thus aggravating the control problem.

"While it is sometimes possible to reduce populations by direct control, it often requires substantial continued effort. Controlling the population by reducing the carrying capacity through habitat change may have long-lasting effects at little cost. For example, cleaning up backyard garbage cuts the rat population down more cheaply and effectively than a trapping campaign."

Buechner (op. cit.) reviewed recent populations of bighorns in the Hilgard, Gallatin and North Absaroka areas. The Hilgard bighorn population, according to Buechner, "...has remained small in recent years. Cattle graze the rocky winter range of the bighorn sheep during the summer, leaving less forage than desired for the maintenance of the sheep in winter." Concerning the Gallatin population, Buechner (op. cit.) indicated the Spanish peaks, Monument Mountain, Hyalite Creek (Peaks), and Tom Miner Basin were areas containing sheep. According to Pallister (1974) the Main Rock Creek, the West Rosebud Creek, and the Main Stillwater River contained the primary winter areas for bighorns in Hunting District 501.

The overall history of bighorns in 301-501 is similar to other areas throughout the State. There apparently were substantial populations prior to 1900, with declines occurring in the "teens." Stability or some increase seems to characterize the populations since the 20's or 30's. The grazing of domestic sheep also became both extensive and intensive around the turn of the century.

The numbers of lambs per 100 ewes in the various portions of 301-501

follows:

West Rosebud (Area 501)

Summer 1973	(Pallister)	64
Fall 1973	"	50
Winter 1973	"	40

Stillwater (Area 501)

Summer 1973	(Pallister)	22
Fall 1973	"	62
Winter 1973	"	36

Deer Creek-Asbestos Creek (Area 301)

January-March 1967	(Constan)	57

Frisina (1975) tabulated hunter harvest information from Hunting District 301 as follows, and made the following comments:

Year[1]	Number Legal Rams Seen Per Hunter	Number Ewes, Lambs Seen Per Hunter	Number Killed Per Hunter	Number Hunters	Number Sheep Harvested[2]
1964	.89	3.8	.04	134	5
1965	.81	6.7	.08	142	12
1966	1.15	22.0	.19	99	19
1967	-	-	-	-	-
1968	.37	11.9	.03	99	3
1969	.96	19.5	.04	160	7
1970	.83	12.0	.05	102	5
1971	.51	11.0	.05	162	9
1972	.39	10.4	.13	208	26
1973	.29	11.7	.04	98	4

1/ The figures in this table are a conservative estimate as a few permit holders indicated seeing sheep but did not write down how many they saw.

2/ This is harvest from questionnaire and thus may not be the total harvest for Area 301.

"The variation in number of legal rams seen per hunter in various years is likely a result of variation in a number of climatic and environmental factors. The number of legal rams seen per hunter in 1973 was lower than

previous years. However, the number of permit holders that hunted in 1973 was considerably less than 1971 or 1972. Weather conditions have a very important influence on the ability of hunters to find rams.

"For six of the nine years the number of sheep killed per hunter was very similar. During the nine years represented, the figure for legal rams killed per hunter never came close to approaching the number of legal rams seen per hunter. The figure for legal rams killed per hunter is always considerably smaller than the number seen per hunter. This indicates hunters are not harvesting all the rams, 3/4-curl or larger available each year.

"The number of ewes, lambs and rams <3/4-curl seen per hunter increased annually from 1964 through 1966. From 1968 through 1973 the number of ewes, lambs and rams <3/4-curl seen per hunter remained fairly constant."

Virtually every study conducted to date concerning bighorn sheep mentions two factors common to virtually all populations of bighorns in Montana, namely lungworm and competition for forage with at least one of the other major ruminants (deer, horses, domestic sheep, cattle).

A review of bighorn sheep literature concerned with ewe/lamb ratios, past history of use of the area, and hunter harvest of 3/4-curl rams reveals that harvesting 3/4-curl rams is considered to cause the least amount of adverse effect on bighorn populations.

Berwick (op. cit.) indicated changes in or deterioration of vegetative types were an important factor in the decline of the bighorn in Rock Creek (Granite County). Berwick also indicated natural predation as negligible. Matthews (op. cit.) indicated a similar pattern on Wild Horse Island and also concluded that "other forms of mortality were not considered to be important factors in reducing the sheep population."

As an example of the Montana Department of Fish and Game's responsibility, interest, and willingness in and for the future of bighorn in 301-501, some changes have been implemented concerning the 1975 hunting season. Hunting District 501 has been divided into three hunting districts. The area between the Boulder and Stillwater River has been designated as one district (H. D. 500); between the Stillwater and West Rosebud as another (H. D. 501); and the remainder of former hunting district 500 lying east of the West Rosebud (H. D. 502). In addition, permits issued for hunting districts 301, 500, 501, and 502 are valid only in that specific hunting district. Any sheep killed under these permits must be reported to or checked by Montana Department of Fish and Game personnel within 48 hours after kill.

It is interesting to note that in several nonhunted bighorn populations lamb/ewe ratios are no better than those in hunted areas. Oldenmeyer, et. al, (1971) observed a lamb/ewe ratio of 47/100 in Yellowstone National Park sheep in 1965-66; while Constan (1967) observed 57/100 in January-March 1967, in the Spanish Peaks area. During this same period, Constan noted a ewe/ram ratio of 100/31.

Highland Mountains - Hunting District 340

This area, lying between Dillon-Whitehall-Butte, is bounded by Interstate 15 (and U. S. 91) on the west, State Route 41 on the east and Interstate 90 on the north. The major part of the sheep range lies north and east of the Big Hole River and west of the Jefferson River. Table Mountain, located approximately in the center of the area, has an elevation of 10,223 feet. The Continental Divide courses through the northern one-third of the area. The history of bighorns in the area is similar to that of other Montana bighorn ranges. The history of cattle, sheep and mining activities is also

similar. In February of 1967, 21 sheep trapped in the Sun River were planted in Camp Creek near Melrose. In January 1969, 32 more bighorns from the Sun River were released in Camp Creek (total plant of 53).

In 1970, the area was opened to hunting (Table 6). The unique feature of this hunting season was that all permits were for sheep of either-sex.

Lamb/ewe ratios observed in the area were:

Between July 1972 and June 1973	50/100
Between July 1971 and June 1972	28/100
Between July 1970 and June 1971	50/100
Between July 1969 and June 1970	64/100

The objective for this particular bighorn population is to maintain a healthy productive herd and provide sport hunting without emphasizing the "trophy" aspect. The hunter has, however, tended toward the harvesting of rams. This trend is not unlike that experienced in the management of deer, elk, antelope, etc., wherein hunters will take a female or "sub-trophy" male, but virtually all hunters pursuing big game would take a "trophy" animal if the opportunity presents itself. We also recognize that there are hunters who only take "trophy" animals (usually males). In the case of the bighorns taken in hunting district 340 none were considered "trophies" as the word trophy is commonly (albeit dubious) used.

REGION FOUR

Sun River - Hunting District 420

The largest bighorn sheep herd in Montana is located in the Sun River-Teton River area west of Choteau and Augusta. The present herd developed from native stock. Early reports indicate the original population was more widely distributed and probably larger in size than the present herd.

Table 6. Region three bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
			HIGHLANDS			
			(Hunting District 340 on 1974 Hunting Map)			
1970	34	5	5	5	2	1♂ and 1♀
1971	34	5	5	5	3	3♂
1972	34	15	15	14	8	5♂ and 3♀
1973	340	15	15	15	8	7♂ and 1♀
1974	340	15	15	14	5	

* Either-sex.

Sheep numbers were depleted when the Sun River area was settled. The population was also decreased periodically by die-offs. A severe die-off occurred in the winter 1924-25 (Couey 1944), which was diagnosed as pneumonia. There were lesser die-offs in 1927 and 1936 (Couey op. cit.). Lungworms were suggested to be a predisposing factor in these losses. Lungworms have persisted in the sheep herd with an apparently high incidence of infection through 1963 (Forrester and Senger, 1964). The incidence of lungworm infection in the Sun River bighorn sheep herd has not been studied recently.

The trend in herd composition of bighorn sheep at Sun River is well documented. Table 7 presents classified counts of sheep in this area from 1941 to 1975. The data indicate variation in the lamb crop during the record period. Such variation is to be expected and could be explained if fluctuations in environmental factors affecting lamb production were also documented.

The lamb survival to early winter in this herd has generally exceeded 40 lambs/100 ewes. This recruitment has been sufficient to increase the herd size as indicated by the trend in total numbers counted.

Sun River sheep have been the subject of annual surveys and studies over a period of 35 years beginning in 1941. A list of unpublished reports and certain publications concerning Sun River sheep is appended to this report. The data and findings accumulated by these surveys and studies have been the basis for management of this herd. Sun River sheep management has also been coordinated very successfully with management of deer, elk, and other uses in the area, as signified by the sheep herd increase and its present size.

The problem of range competition of sheep with elk, deer and livestock was studied (Schallenberger 1966). A need to lessen range competition of sheep

Table 7. Classified counts of bighorn sheep, Sun River - 1941-1975.

Year	Number 3/4-Curl Rams	Rams	Ewes	Lambs	Unk.	Total	Ratio/100 Ewes Rams	Yrlgs.1/	Lambs
1941	33	57	75	27	0	159	76	-	36
1942	43	41	58	36	0	135	71	-	62
1944[2]	-	-	-	-	-	-	66	-	41
1945	-	36	38	17	10	101	95	-	45
1946	29	61	60	32	6	159	102	-	53
1947	18	37	56	14	11	118	66	-	25
1948-49	-	49	97	28	0	174	51	-	29
1951	-	58	68	38	17	181	85	-	56
1952	-	98	114	75	3	290	86	-	66
1941-52 Count totals (prior to hunting)		437	566	267	0	1,270	77	-	47
1953-54	-	57	98	27	60	242	58	-	28
1954-55	34	75	121	54	12	262	62	-	45
1955-56	-	62	113	62	38	275	55	-	55
1956-57	21	61	125	54	88	328	49	-	43
1957-58	19	43	89*	50	143	325	48	-	56
1958-59	20	55	117*	67	35	274	47	-	57
1959-60	20	77	131	52	109	369	59	-	40
1960-61	19	48	117	69	64	298	41	-	59
1961-62	17	67	209	86	55	417	32	-	41
1962-63[3]	-	(20)	(85)	(29)		(134)	(24)	-	(34)
1963-64	8	37	117	61	34	249	32	-	52
1964-65[4]	-	-	-	-	-	-	48	-	40
1965-66	12	78	138	75	0	291	56	-	54
1966-67	15	108	289	98	0	495	37	-	34
1967-68	-	66	172	78	0	316	38	-	45
1968-69	10	78	281	111	20	490	28	-	39
1969-70	9	119**	288	135	69	611	41	43	47
1970-71	8	111**	326	150	2	589	34	31	46
1971-72	11	138**	310	142	8	598	45	37	46
1972-73	24	146**	341	180	105+	772+	43	20	53
1973-74[5]	32	182**	371	167	174	894	49	29	45
1974-75[5]	34	156**	403	203	204	966	39	13	50

1/ Figure arrived at by following formula: $2\frac{\text{(number of yearling rams)}}{\text{number of females}}$

2/ Repeated observations 2,215 sheep (Couey, 1944)

3/ Incomplete classified count

4/ Repeated observations 2,465 sheep (Schallenberger 1966)

5/ A large portion of Deep Creek Herd Segment not classified during these years - thus 3/4-curl ram figure probably low.

* Some yearling rams classified w/ewe.

** Includes 1/4-curl or less males.

with elk and deer was recognized and big game management plans for the Sun River included an increased harvest goal of herd segments on sheep winter range. During the 10-year period 1964-1973, approximately 5,000 elk and 14,000 deer were harvested from the Sun River areas. The problem of livestock grazing on sheep winter range was also alleviated.

During this same period, 368 sheep were harvested, 320 either-sex sheep were removed for transplanting, and 20 sheep were removed for experimental purposes. The levels of deer and elk harvest together with sheep harvest and other sheep removals from the Sun River area were sufficient to preserve a generally thrifty and increasing sheep herd. However, it will be important to maintain a proper balance of harvests among elk, deer and sheep to maintain satisfactory range conditions and minimum competition between these big game species in the future.

Trapping and transplanting operations removed 497 sheep from the Sun River herd during the period 1941-1974. The following tabulation indicates the removal of sheep by trapping has increased over the years.

Year Period	Number Sheep Transplanted
1941-1954	28
1955-1959	50
1960-1964	58
1965-1969	150
1970-1974	211
Total	497

A recent trapping cost estimate of about $40 per sheep was reported (Watts, Schallenberger, Feist, 1972) for the period 1967-1971. Wild animal trapping operations are generally not standardized and costs are affected by many field conditions. The cost estimate provides a means of estimating funds needed to trap and transplant sheep when that alternative of management is considered a feasible program.

The Sun River sheep herd has provided stock from which other sheep herds have been established in Montana. Table 1 lists the sheep transplants to date. The Sun River herd should continue to be a source of stock for future transplants. The either-sex removal of sheep to date by trapping has contributed to the growth and welfare of this herd.

Sheep hunting in the Sun River followed the closed season pattern of other districts in the state. Hunting resumed in 1953 and has been continued to date. Table 8 gives the harvest records of Sun River sheep in Region Four.

A total of 648 sheep, nearly all rams, have been harvested from this herd over the 21-year period 1953-1973. The 1971 North American Big Game record book by the Boone and Crockett Club, includes 16 sheep from the Sun River. Either-sex permits were issued in 1972 and 1973, when 1 female and 3 females respectively were harvested. The popularity and tradition of hunting bighorn sheep rams primarily for their trophy horns apparently strongly persists among hunters. Female sheep permits were issued in 1974 in an effort to increase the removal of the female segment of the herd. This method, used to regulate herd size in other big game species, will be evaluated in the Sun River sheep herd.

Table 8. Region four bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
		SUN RIVER (Hunting District 420 on 1974 Hunting Map)				
1953	3	20	20	-	16	
1954	203	20	20	-	19	H. D. renumbered
1955	203	20	20	-	12	
1956	203	20	20	-	15	
1957	403	40	40	-	32	H. D. renumbered
1958	403	40	40	40 (?)	30	
1959	42	40	40	39	35	H. D. renumbered
1960	42	40	40	37	30	
1961	42	40	40	34	32	
1962	42	40	40	38	28	
1963	42	40	40	38	31	
1964	42	40	40	36	27	
1965	42	40	40	39	37	
1966	42	40	40	37	34	
1967	42	60	60	60	52	
1968	42	60	60	59	45	
1969	42	60	60	57	40	
1970	42	60	40	36	29	
1971	42	40	41	41	34	
1972	42	40 ES	40	40	32	One female
1973	420	40 ES	40	39	38	Three females. H. D. renumbered
1974	420	40 ES 20 Ewes	60	57	52	Thirteen females
		ARMELLS CREEK (Hunting District 482 on 1974 Hunting Map)				
1969	482	10	5	5	5	
1970	482	5	3	3	3	
1971	482	3	3	3	3	
1972	482	3	-	-	-	Season cancelled
1973	-	-	-	-	-	No open season
1974	-	-	-	-	-	No open season

* 3/4-curl rams except those noted as either-sex or ewes.

During the 15-year period, 1958-1973, 701 licenses were issued. A total of 554 hunters was afield and enjoyed 83 percent success in taking sheep. The average hunter spent 8 days afield hunting sheep in 1973.

A five-year study of range use and movements of Sun River sheep (Erickson, 1972 and Frisina 1974) was completed in 1974. These studies identified herd segments within the Sun River sheep herd. Analysis of harvest data indicated the herd segments wintering east of Gibson Dam and in the Ford Creek area, which are most accessible to hunters, provided 43 percent and 29 percent respectively of the harvest, 1969-1972.

Bighorn sheep harvest in each of four wintering areas, 1969-1972.

Location	1969	1970	1971	1972	Total	Percent
Sun River - East of Gibson Dam	14	13	11	14	52	43
Sun River - West of Gibson Dam	1	5	7	4	17	14
Ford Creek	14	6	8	7	35	29
Deep Creek	9	1	3	5	18	14
Total Known Locations	38	25	29	30	122	100
Total Harvest	40	29	34	32	135	

Classification counts also indicated a decrease in the number of rams, 1/2-curl or more in the most accessible areas east of Gibson Dam and Ford Creek. These findings were the basis for sub-dividing hunting district 420 into four new hunting districts; 421 - Deep Creek, 422 - Castle Reef, 423 - Gibson Lake North, 424 - Ford Creek, beginning with the 1975 hunting season.

The goal of this change is to manage the Sun River bighorn sheep herd by individual herd segments on specific wintering areas. The herd segments will be maintained within the carrying capacity of their respective wintering areas. Ewe only-permits as well as either-sex permits will be required in the four hunting districts to accomplish these management goals.

Sun River bighorn sheep studies have provided information on the composition, production, distribution, movement and herd segments of the population. Food habits and range conditions are known. Hunting and harvests from this herd have been analyzed. The trapping removals from the herd have been evaluated. Trend information is being accumulated each year on populations, range and harvest. If recommendations for management of this herd, based on these studies and findings in the future are followed, the Sun River bighorn sheep herd should remain an important big game resource in Montana.

Two-Calf (Armells Creek) - Hunting District 482

The badlands and Missouri Breaks area of Montana were historical sheep range. In 1957 a sheep pasture approximately 1,400 acres in size was constructed in cooperation with the U. S. Fish and Wildlife Service at Two-Calf Creek, of the Charles M. Russell Game Range. Upon completion of this pasture, 43 sheep were released from the Sun River and Bison Range areas from 1958-1961.

Eichhorn and Watts (1971) stated, "The bighorn population increased slowly from the original 43 transplants. Lamb production was good in 1969 and the population increased to at least 51. The following year productivity was even better and a ratio of 79 lambs per 100 ewes survived the winter, boosting numbers to at least 63. This is probably the highest production and lamb survival rate on record for North American bighorns. Productivity remained good in 1971 and the population jumped to 90. However, the herd experienced high mortality during the 1971-72 winter."

Classified counts available for this transplanted herd are given in Table 9. The herd increased until 1970. Hunting seasons on 3/4-curl rams were held in 1969, 1970 and 1971 (Table 8). A season scheduled for the fall of 1972 was cancelled because of the herd die-off during the previous winter.

Range conditions for this herd is a critical problem. Administration of the pasture and adjacent range is complicated and drought conditions increased the forage problem. There were lambs born in June of 1973 and 1974, but none survived to the following winter season. Without lamb recruitment, the status of this herd is in jeopardy. Efforts are being made by the administering agencies to improve the forage conditions for this herd through improved livestock grazing management in the area. The future of this herd will depend on how well sheep forage requirements will be met under the administration of the range resource by cooperating agencies.

Other Areas in Region Four

Attempts have been made to establish sheep herds in three other areas of Region Four. The locations of transplants are given in Table 1.

These transplants have not established sheep herds of sufficient size for hunting. Sightings of sheep at distances away from the release site have suggested the transplants were not successful.

Future transplant areas should be investigated thoroughly to determine that proposed sites presently meet the requirements of sheep. More attention should also be given to the number, sex-age composition and the social relationships in the group of sheep to be transplanted. Control or agreement to reserve grazing in the transplant area to insure adequate forage for sheep may also be necessary.

The acquisition of the Beartooth Game Range (near Wolf Creek) by the Department in 1970 provided additional historic sheep range in public ownership.

Table 9. Classified counts of bighorn sheep, Two-Calf - 1958-1974.

Year	Ram	Ewe	Lamb	Total	Rams/100 Ewes: Rams	Rams/100 Ewes: Lambs
1958 (Transplant)	(2)	(5)	0	(7)		
1959 (Transplant)	(9)	(4)	0	(13)		
1960 (Transplant)	-	-	-	(11)		
1960	11	5	5	21 (35)		
1961 (Transplant)	(4)	(7)	(0)	(12)		
1961*	-	-	9	50		
1962*	-	-	8	53		
1963*	-	-	9	60		
1964*	11	13 1/	7	40		
1965*	-	-	15	55		
1966*	16	16 1/	14	60		
1967*	8	12 1/	12	80		
1968*	-	-	22	100		
1969*	8	17 1/	23	100		
1969-1970	16	24	11	51	40	46
1970-1971	11	29	23	63 (90)	46	79
1971-1972	3	18	2	23	18	11
1972-1973	3	18	0 2/	21	18	0
1973-1974	3	15	0 3/	18	20	0

* Data from Fish and Wildlife Service records, C. M. Russell Game Range, Lewistown.

1/ Probably incomplete ewe counts.
2/ 5 lambs in June.
3/ 8 lambs in June

Transplants of sheep from the Sun River have since been made in the Gates of the Mountains area (Table 1) with undetermined success to date.

REGION SIX

Thompson (1950), based on "...scattered notes in the diaries of Montana explorers and the reports of early residents..." mapped the distribution of the badlands sheep. He depicted the range of these sheep as extending from the eastern border of Montana up the Missouri River to the vicinity of Arrow Creek in northwest Fergus County and up the Judith River into the Little Belt Mountains and into the Big Snowy Mountains. He also showed their range as extending up the Musselshell River to the Bull Mountains south of Roundup. Brown (1953) investigated a site for the possible introduction of Rocky Mountain bighorns at Gas Springs in Blaine County. Thompson (op. cit.) listed the Larb Hills southwest of Glasgow in Valley County as the location of the last known (circa. 1914) badlands sheep in that area. Because Rocky Mountain sheep have been introduced into badland habitat along the south side of the Missouri River, the suitability of the Little Rockies in Phillips County was investigated as a possible site for the introduction of these sheep. As indicated in Table 1, bighorns have been transplanted into the area. At the present time, this is the only known occurrence of bighorns in Region Six.

REGION SEVEN

Billy Creek - Garfield County

The journals of Lewis and Clark noted Rocky Mountain bighorn sheep in much of Montana, although those occupying the lower Missouri and Yellowstone Breaks were later classified as the Audubon sub-species. The last known kill in Montana of the now extinct Audubon was in the Billy Creek area of the Missouri Breaks in 1916, Couey and Schallenberger (1971) and Thompson (op. cit.).

In 1947, the Montana Department of Fish and Game investigated the Billy Creek area and plans were made to introduce bighorn sheep. A holding pasture encompassing 328 acres was enclosed with a nine-foot woven wire fence, at the head of Billy Creek, about 40 miles west of Fort Peck Dam. The fence was completed in the fall of 1947 and on November 16, 1947, 16 bighorns; 3 rams, 9 ewes, and 4 lambs were released. These sheep, located in an area formerly occupied by Audubon sheep, were obtained from Colorado's Tarryall herd, through the Colorado Game and Fish Department in exchange for Montana mountain goats. In October 1952, 5 years after introduction, the pasture fence was removed. Some sheep escaped from the pasture prior to fence removal, at which time approximately 70 head were in the vicinity. At least one-third that number also occurred within the pasture as 28 were observed in June of 1952. Surveys after fence removal showed most sheep remained within 5 or 6 miles of the old pasture site, although reports from residents of the breaks indicated some were present 40 miles east and 25-30 miles west of the pasture site. By August of 1954, department personnel estimated that a population of about 130 bighorns inhabited the area, most within 10 miles of the release site, Egan (1954).

In the fall of 1955, a hunting season for five 3/4-curl rams was held on the Charles M. Russell Game Range in Garfield County. Two of the five permit holders did not hunt and of the three who did, two were successful. The three sheep hunters reported seeing a total of 25 sheep all near the pasture site. Nine bighorns were seen in the same vicinity by Fish and Game personnel during the summer of 1956.

In 1956, a season was held for ten 3/4-curl rams. Six of the permit holders hunted and none were successful. One of the unsuccessful hunters was

quite disappointed and blamed the Department for his failure. As a result of this criticism, sheep seasons in Garfield County were discontinued.

In April 1957, five ewes were observed near the pasture, and in January 1958, four rams were seen in the same area.

Since January 1958, no specific surveys have been conducted for sheep and by 1960 all reports indicated sheep had disappeared.

Bighorn sheep apparently increased eight-fold in seven years from the original 16 in 1947 to some 130 by 1954 and then disappeared by 1960. Obviously, the total harvest of two 3/4-curl rams was not responsible for the demise of this sheep population, no more so than the harvest of a few civilians accounted for the rise and fall of the Roman empire. The best that can be said is that department personnel made an honorable, but expensive, unsuccessful attempt to establish a huntable bighorn sheep population for sportsmen with sportsmen money.

From the existing information it appears the Rocky Mountain bighorn sheep was unable to establish a stable population for some reason other than hunting.

Blue Mountains - Hunting District 760

Recent bighorn sheep populations in the Blue Mountains of hunting district 760 originated from two transplants made in 1958. Twelve sheep; 4 rams and 3 ewes from Wild Horse Island, and 3 ewes and 2 lambs from the Sun River were released near Blue Mountains on April 26 and May 20, 1958, respectively. A considerable amount (about 42,000 acres) of land in hunting district 760 is administered by the Bureau of Land Management; consequently an agreement was made with that agency prior to the sheep plant. The agreement called for a maximum herd of 50 grown sheep and when this goal was reached steps would be

taken to harvest the surplus. For several years the sheep did not increase appreciably, but in the summer of 1965, an aerial survey indicated a minimum population of 65-70 sheep (Compton 1967). As a result of survey information a hunting season was initiated in the fall of 1965, and conducted each year thereafter to the present (Table 10).

Surveys during the three-year period (1966-68) following 1965 indicated bighorns were either decreasing or had dispersed; consequently an intensive ground and aerial survey was conducted during the summer of 1969. Data from the survey, conducted from mid-June through September, showed a minimum population of 45 bighorns. It also indicated sheep had dispersed as one group of rams was observed 90 miles from the release site. Present populations appear to be similar in distribution and density, to those of 1969 as determined from department surveys and observations by landowners and sportsmen. One of the 1974 hunters reported seeing at least 40 individual sheep.

These data suggest the populations reached a peak seven years after release and then leveled off to a point commensurate with suitable habitat which expresses two well-known wildlife principles; (1) a buildup and leveling off following a successful release and (2) the principle of "so many and no more."

It is difficult to believe that a harvest of nine 3/4-curl or better rams over a 10-year period did nothing more than that which was intended, namely to provide recreation for all under a program funded by sportsman's dollars.

Table 10. Region seven bighorn sheep harvest.

Year	Hunting District Number	Number Permits Available*	Number Permits Actually Issued*	Hunters Actually Hunting	Harvest Estimate	Remarks
			BILLY CREEK			
			(Hunting District 204 on 1956 Hunting Map)			
1955	206	5	5	-	2	
1956	204	10	10	8	0	
			BLUE MOUNTAINS			
			(Hunting District 760 on 1974 Hunting Map)			
1965	760	3	3	3	3	
1966	760	2	2	2	1	
1967	760	2	2	2	0	
1968	760	2 + 3 Ewes	5	3	0	
1969	760	2 + 3 Ewes	2	2	1	
1970	760	2	2	2	1	
1971	760	2	2	2	1	
1973	760	2 ES	2	2	1 1/	
1974	760	2 ES	2	2	1 1/	

1/ 3/4-curl ram taken on either-sex permit.

* 3/4-curl ram except those noted as either-sex or ewes.

OUTLOOK

It is very difficult if not impossible to determine the amount of potential or occupied bighorn habitat at any given time prior to 1940.

Buechner (1960) offered, by map, a probable distribution of bighorns in the western United States prior to the coming of white man. The distribution indicated for Montana included almost all of southwestern Montana, perhaps one-third of northwestern Montana, somewhere around three-fourths of mid-and southcentral Montana, and virtually all of the Missouri River below the Great Falls, and of the Yellowstone River below present day Billings. Portions of the Big Horn, Tongue and Powder Rivers were also included.

Although Lewis and Clark recorded sheep along a good share of their journey on the Missouri and Yellowstone Rivers, there is little insight into bighorn densities in the places they did not visit.

The following quote taken from the "Biennial Report, Montana Fish and Game Commission, 1941-1942," is probably a reasonable description of the status of bighorn in Montana around 1940, "The small number of mountain sheep remaining in the state are apparently little better than holding their own. The reason for this is the number one wildlife problem, not only in Montana but throughout the west. From one of the more abundant big game species of half a century ago, the mountain sheep have dwindled to a small number of isolated groups."

Couey (1950) presented a map showing "original habitat" and "present distribution" of sheep in Montana about 1950.

The map attending the Biennial Report quote indicated the 1940 distribution fell within but was smaller than that suggested by Buechner for the pre-white man era and similar to that presented by Couey.

Bighorn sheep distribution, in Montana in 1970, was presented, by map, in "Game Management in Montana" (1971).

These several sources, although not delineating sheep habitat, past or present, in terms of exact locations or in terms of square miles, have indicated localities where sheep were present historically and areas where they are present at this time.

The pre-white man distribution suggested by Buechner could only be reestablished by extensive changes in present day land use and people populations. Such changes are not likely to occur.

There are a few other areas where, although bighorns were present in this century, it is unlikely any substantial populations can be reestablished and maintained. The Missouri River Breaks might be an example of such an area.

Conversely there may be areas where even though bighorns were never abundant or even lacking, substantial populations could be established and maintained.

There is adequate evidence to conclude that the Sun River and the Madison-Gallatin-Absaroka areas were historic bighorn ranges. These areas presently support substantial populations. The Kootenai Falls area currently supports bighorns as a result of reintroduction via the Department of Fish and Game's transplanting program. However, a substantial Missouri River Breaks bighorn population has not materialized from a reintroduction. In the Breaks the failure might be related to, among other things, the fact that historic sheep populations were probably Audubon sheep and reintroductions were Rocky Mountain bighorns.

Using the distribution map appearing in the 1941-42 Department Biennial Report as a basis for comparing habitat occupied by bighorns in 1942 with habitat occupied now, the success of the Fish and Game's management program (including the transplanting aspect) for bighorns can to some extent be evaluated.

A very rough estimate of the mountain sheep range as presented in the 1941-42 Biennial Report appears in Table 11.

Table 11. Estimated bighorn sheep range in Montana - 1942.

Locality	Locality Area (square miles)	Estimated Size of Sheep Range (square miles)
Lincoln County	3,715	181
Flathead and Glacier Counties	8,151	274
Sanders County	2,811	43
Teton and Lewis and Clark Counties	5,771	354
Granite County	1,733	82
Madison County	3,530	86
Madison, Gallatin, Park, Sweet Grass, Stillwater and Carbon Counties	14,387	1,163
Total		2,183

The 2,183 square miles represents mountain sheep range estimated to be present in 1942, and is not necessarily an estimate of occupied habitat in 1942, although it could be.

The estimated amount of occupied habitat present in 1975 appears in Table 12 and is more accurate than the information presented for 1942 (Table 11).

If it can be assumed the figure of 2,183 (Table 11) represented the number of square miles occupied by mountain sheep around 1942, and considering that in 1975 the occupied area was estimated at 3,453 square miles (Table 12), the increase from 1942 to 1975 in occupied sheep habitat was at least 58 percent.

Table 12. Occupied bighorn habitat in Montana - 1975.

Locality*	Locality Area (sq. mi.)	Overall Distribution (sq. mi.)	Current Status of Distribution Area	General Winter Range (sq. mi.)
Mtn. sheep H. D. 100 (Lincoln Co. Locality)	3,876	185	Diminishing	65
Mtn. sheep H. D. 121 (Sanders Co. Locality)	2,048	210	Static	34
Deer H. D. 230	-	5	Diminishing	1.0
Mtn. sheep H. D. 213	186	20	Increasing	5.0
Deer H. D. 216	-	5	Increasing	5.0
Mtn. sheep H. D. 250	700	107	Static	1.5
Mtn. sheep H. D. 270	587	91	Increasing	-
Mtn. sheep H. D. 301 (Madison, Gallatin, Park Counties Locality)	3,550	839	-	19.4
Mtn. sheep H. D. 340	813	86	Increasing	21
Mtn. sheep H. D. 420 (Teton and Lewis and Clark Counties Locality)	1,084	484	Increasing	43
Adjacent to H. D. 420 (N & W)	-	106	Static	4.6
Deer H. D. 455	-	15	Recent plant	-
Deer H. D. 410 (Old mtn. sheep H. D. 482)	1,233	53	Diminishing	10
Mtn. sheep H. D. 501 (Park, Sweet Grass, Stillwater, Carbon Counties Locality)	2,225	1,135	Static	24.7
Deer H. D. 621 & 680	-	62	Recent plant	-
Mtn. sheep H. D. 760	355	50	Diminishing	-
Total		3,453		234.2

* Reference: 1974 Deer, Elk and Bear and Antelope, Moose, Mountain Goat and Bighorn Sheep Hunting Regulations Map

Montana does not presently have the mountain sheep populations or the distributions that existed prior to the turn of the century.

Current population levels and distributions however are <u>greater</u> than those that existed around 1940. In approximately 35 years of management, which is defined to include hunting as well as the transplanting and research programs, mountain sheep densities in Montana have been increased. Such increases, however, could not be realized without an awareness of and efforts directed at maintaining the habitat. The current status of bighorns in Montana by administrative regions appears in Table 13.

Table 13. Current status of Montana bighorn sheep - 1975

	Administrative Regions						
	One	Two	Three	Four	Five	Six	Seven
1. Square miles of bighorn habitat	339	325	-	700	2,475	300	250
2. Square miles of No. 1 being hunted	44	40	-	484	1,800	0	25
3. Amount of No. 1 occupied before 1942	155	40	-	590	1,135	0	0
and occupied now (sq. mi.)	325	70	925	605	1,235	30	50-75

Some discrepancies exist between the presented sizes of sheep habitat because of different land bases on which the estimates were made. All of the recent estimates however show an increase in sheep distribution over that present in 1942.

The sportsmen of Montana, through their Fish and Game Commission and its department, have responded to the needs of the bighorn in their State. They increased the "small number of isolated groups" of bighorns present in Montana in 1942 to a level where they can be viewed in many localities of Montana.

With sportsmen's dollars (hunting license fees and excise taxes collected on sales of sporting arms and ammunition administered under the Pittman-Robertson Act) the Montana Fish and Game Commission in 1941 began a research and management program with the objective of increasing bighorn populations. The present improved populations and distribution of bighorns is a result of those programs, which since 1953, has included hunting. It is therefore important to note that bighorn populations now present in Montana occur because of and not in spite of the hunter and his activities.

The bulk of the hunting seasons held in Montana since 1953 have been for rams with a 3/4-curl horn or better. Restricting harvest to the "3/4-curl male" segment of a population with the added limitation of hunting by permit only, relegates sport hunting to an almost insignificant mortality factor.

Even in those areas where females are allowed as the bag, the harvest is restricted under the permit system.

In areas 500 and 502 where the sale of permits is on an unlimited basis, the harvest is restricted because only rams with a 3/4-curl horn or better can be taken.

Quality and quantity of required habitat will be the primary factor in determining the future of Montana's bighorns. Montana's sportsmen will be a primary motivating force to insure that the habitat is maintained at those levels.

Sport hunting is a legitimate use of the bighorn resource and also provides one of the incentives for the hunter to continue his efforts towards maintenance of wildlife and its habitat. It will indeed be unfortunate for the Rocky Mountain bighorn if these efforts cease.

October 1975

APPENDIX A

A LIST OF UNPUBLISHED REPORTS AND CERTAIN PUBLICATIONS CONCERNING SUN RIVER SHEEP 1941 - 1975

Buechner, Helmut K. 1960. The bighorn sheep in the United States, its past, present and future. Wildl. Mono. No. 4., The Wildlife Society, pp. 38, 98, 116, 130, 131, 157.

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Erickson, Glenn L., C. R. Watts, A. D. Schallenberger, F. G. Feist. 1973. Big game survey and inventory. Antelope, mountain goats, bighorn sheep, moose and bear. Project W-130-R-4, Job I-4. Mont. Dept. Fish and Game. 64 pp. Multilith.

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Martin, Neil S. 1966. Big game survey and investigations. Antelope, bighorn sheep, mountain goats and bear. Project W-74-R-10, Job A-1. April 1966. Mont. Dept. Fish and Game. 12 pp. Multilith.

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McDowell, L. E. 1952. Bighorn sheep count Flathead-Sun River unit. 1951 Project W-1-R. Mont. Dept. Fish and Game. pp. 28-30. Multilith.

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